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ABSTRACT

A practicum was conducted to examine and improve the performance of students enrolled in a college of culinary arts on the National Restaurant Association Foodservice (NRAF) sanitation certification examination. Because the pass rate among students retaking the examination was lower than that among students taking the examination for the first time, it was hypothesized that a review seminar might be needed to help increase the pass rate among students retaking the certification examination. A 90-minute review seminar was developed with information gathered during a review of the literature on food sanitation and food safety education. The seminar was offered to 39 of the 85 students who had failed the NRAF examination on their first attempt. Three days later, the certification examination was readministered to all 85 students. A chi-square analysis of the test scores established that the review seminar did increase the performance of students retaking the NRAF sanitation certification examination. It was recommended that a review seminar similar to the one developed during the study be implemented and provided to students taking the NRAF examination for the first time and to students retaking the examination. (Contains 12 references) (MN)

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A COMPARISON OF STUDENT PERFORMANCE IN A NATIONAL RESTAURANT ASSOCIATION FOODSERVICE SANITATION EXAM BY STUDENTS TAKING VERSUS THOSE NOT TAKING A REVIEW SEMINAR

Research Methodology

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U.S. DEPARTMENT OF EDUCATION
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A practicum Report presented to Programs for Higher Education in partial fulfillment of the requirements for the degree of Doctor of Education

Nova Southeastern University

September, 1997

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Abstract of a practicum report presented to Nova Southeastern University in partial fulfillment of the requirements for the degree of Doctor of Education

A COMPARISON OF STUDENT PERFORMANCE IN A NATIONAL RESTAURANT ASSOCIATION FOODSERVICE CERTIFICATION EXAM BY STUDENTS TAKING VERSUS THOSE NOT TAKING A REVIEW SEMINAR

by

Ernest Fleury

September, 1997

The problem under investigation was statistics indicated a lower pass rate in those Johnson & Wales College of Culinary Arts (J&W, CCA) students retaking a National Restaurant Association Foodservice (NRAF) sanitation certification exam than those having taken the exam for the first time. Indications were there may be a need to develop a process to increase the pass rate for students retaking the certification exam.

The purpose of this study was to compare the pass rate of students who attended a review seminar with students who did not.

The research hypothesis was J&W students who attend a review seminar prior to taking the NRAF sanitation certification exam have a higher pass rate than those J&W students who do not.

A ninety minute review seminar for both am and pm sessions was provided. Three days later a retake exam was administered to two groups, students who had taken a review seminar and those who had not. The sample consisted of 85 J&W freshman and sophmore

culinary students who initially did not pass the NRAF sanitation certification exam. Of the 85 students, 39 had attended a seminar and 46 had not.

The chi-square test was used to analyze data. The results of the analysis were to reject the null hypothesis at the .0500 level of significance because X) of 11.213868 is greater than the critical value of 3.841000. The degree of freedom was 1 and the P value was .00081. The results of the analysis indicated that there was a higher pass rate of J&W students attending a review seminar than those who did not.

It was concluded that a review seminar did increase the pass rate of students retaking the NRAF sanitation certification exam at J&W, CCA.

It was recommended that a review seminar similar to the one developed in this study be implemented at J&W for both the initial and the retake NRAF sanitation certification exam. It was also recommended that this same process be implemented at all J&W branch campuses.

Chapter 1

INTRODUCTION

Nature of the Problem

The Johnson & Wales, College of Culinary Arts (J&W,CCA) Associates Degree Program consists of two trimesters of labs and one trimester of academic studies in both the freshman and sophmore years. The 1050 Applied Food Sanitation Certification Course (1050) is one of five academic courses required of all freshman students. The purpose of the 1050 course is to introduce the student to the principles of food microbiology, important foodborne diseases, applied measures for the prevention of foodborne diseases, and other microbiological problems. The course also emphasizes the importance of using the Hazard Analysis Critical Control Point system (HACCP). If a passing grade of 75% or more is achieved on the final exam, the student receives a certified food handlers certificate. Those students who do not may arrange to retake the exam without having to retake the 1050 course.

A student activity report from the Educational Foundation of the National Restaurant Association (EFNRA) showed that from January 10, 1995 to April 27, 1997, 3,427 J&W students from the Providence campus had taken the certification exam, 910 of these students did not pass, resulting in a 73.45% pass rate. This pass rate percent was the highest of all four campuses. During this period 241 students took the retake exam resulting in a pass rate of 51%. The report further showed that there were 286 J&W culinary students currently enrolled in Providence who had taken

the sanitation certification exam and did not pass. The last retake exam offered during this period consisted of 15 students resulting in a pass rate of 0 % (EFNRA).

The statistics indicated that there was a lower pass rate in those J&W students retaking the exam than those having taken the exam for the first time. The information provided in this report indicated that there may be a need to develop a process that will increase the pass rate for students retaking the certification exam at J&W, CCA. The Dean of the college had asked the professors teaching the 1050 course to research the issue and provide their recommendations before the next retake exam.

The four professors who teach the 1050 course, the academic department chairperson, along with counsel from the EFNRA met to resolve the issue. It was concluded that, dealing with the narrow time parameters and the urgency of the issue, the most direct and cost effective approach was to provide two 90 minute review seminars to accommodate both the am and the pm students. The proposal was presented to the dean for internal validation and was accepted. The purpose for the seminar was to increase the students chance to pass the retake exam. The seminar format was the same used by the researcher on the last class day before all certification exams, which is to review the course.

Students were asked to bring the certification course text that was originally required for the 1050 course on the day of the seminar. The instructor handbook that accompanies the text was used by the researcher to provide a comprehensive outline of the four major sections of the text. A lecture format with

overhead transparencies was employed to highlight major topics of each chapter. Students were encouraged to ask questions about areas where they may have difficulty. In the back of the text there are multiple choice questions that corrospond to the four sections with the rationale and an answer key. These questions are similar and often the same as those commonly found on the certification exam. This also provides the student an effective tool to use as a further review before the exam. Emphasis was placed on case studies at the end of each chapter which require critical thinking and deductive reasoning on the part of the student.

Purpose of the study

The purpose of this study was to compare the pass rate of students who attended a review seminar with students who did not.

Significance to the College

If students who participated in a review seminar achieve a higher pass rate than those who did not, J&W can consider restructuring of the present process for students retaking the certification exam. The results of the restructuring may also be effective in improving the pass rate for students retaking certification exams in other curricula at the university.

Relationship to the Seminar

The nature of this proposal was appropriate for the Research Seminar since a literature review was conducted, a research hypothesis was developed, and data was analyzed through inferential statistics. The seminar also taught students methods of research, data analysis and techniques used in identifying

problems. The Trends and Issues Seminar provided the researcher the ability to disimilate noise from signal and to initiate change when necessary. The Human Resource Development Seminar provided insights to identify weaknesses in the organization and the tools needed to convert these weaknesses to organizational strengths. As the nation moves toward the twenty first century, educators must be change agents that bring about meaningful changes in the educational process that will guarantee their institution a competitive position in the emerging global society.

Research Question

Do J&W, CCA students who participate in a review seminar prior to taking the NRAF sanitation certification exam have a higher pass rate than those J&W students who do not?

Research Hypothesis

J&W students who attend a review seminar prior to taking the NRAF sanitation certification exam have a higher pass rate than those J&W students who do not.

Definition of terms

The Educational Foundation of the National Restaurant Association (EFNRA). This foundation provides educational services to the foodservice industry. The foundation promotes sanitation through the National Food Safety Certification Program, which is aimed at helping operators train employees in food safety practices.

The Hazard Analysis Critical Control Point (HACCP) System. HACCP is a food safety system that focuses on potentially

hazardous foods and how these foods flow through the foodservice system. A HACCP system, when properly applied and implemented, provides high assurance that foodborne outbreaks and food spoilage will not occur.

A trimester (tri). One third of the academic year at J&W and consists of 45 class days.

Early Warning System. A food safety regulation under the control of the Food and Drug Administration and the Food Service Inspection System. Its purpose is to identify hazardous foods at their source of production and prevent them from entering the U.S. consumer market.

Chapter 2

REVIEW OF THE LITERATURE

A comprehensive literature review was conducted. This search was divided into three conceptual areas.

The first area provided the historic significance of the issue of sanitation and food safety and its relationship to this research study. The sources of information were texts and reference books from the J&W, Nova Southeastern, the University of Rhode Island libraries and other culinary institutions similar to J&W. A United States (U.S.) government agency report was also used.

The second source of information was provided by attendance at national conferences, regional seminars and local workshops. A national study was also referenced.

The third search was conducted to identify educational institutions with similar sanitation courses as J&W that could be used as benchmarks for the study. Areas of particular concern were sanitation testing procedures, their pass rate, and the process used for retake exams. The EFNRA provided access to student activity reports and information concerning culinary and hospitality sanitation programs nationwide. Catalogs, journals, government reports and periodicals were also accessed from Nova Southeastern on line.

Historic Significance

The traditional spot check inspection of foodservice facilities by the department of health has its roots in the earliest days of public health in the United States. Since the

1930's and 1940's there have been revisions and refinements to the codes, but no real fundemental changes. This system has greatly improved sanitation and upgrade facilities in the United States, but did not reflect our present knowledge of the cycle of foodborne disease.

When the National Aeronautics and Space Administration (NASA) began to send people into space, the agency was not comfortable with standard quality control techniques. A preventive system was needed, but the old procedures then in use were mostly reactive. The HACCP system was developed for NASA by the Pillsbury Company (Cichy, 1994). The system documents contributing factors to foodborne illnesses, charts the flow of food, and prioritizes associated hazards. If each step of this process is carried out correctly, the end product will be safe food.

All foodservice educational programs address the issue of sanitation at some level, the emphasis depends on the amount of exposure the student will have in preparing food in their job description. The U.S. Centers for Disease Control (CDC) has declared that humans with poor personal hygiene and sanitation skills are the primary factors contributing to foodborne illness. Foodservice operators aware of the immeasurable costs of foodborne outbreaks have also taken the initiative to train employees according to their level of required sanitation. Corporations such as Pepsi Cola have taken a giant step toward sanitation education. Each year $60 million is spent on courses, sanitation drills and rewards for employees. Pepsi has a non-

negotiable policy of not seeking market share at the expense of their customers' health. The Marriott Corporation embraces a policy similar to Pepsi. John Baptista, northeast regional foodservice recruitment co-ordinator for the division believes that industry must be confident that a critical issue such as public safety receive priority in the training of the graduates that corporations consider for employment (Marriott, 1994).

Current Status

A recent study by the National Society of Professional Sanitarians (NSPS) emphasizes the growing need for legislation that would make national sanitation certification mandatory. Presently, mandatory certification exists in twenty states and is growing steadily (Gould, 1995). Dr. Ernest Julian, Chief of Rhode Island Health Services supports the NSPS study. At the national conference "Changing Strategies, Changing Behavior" held at Georgetown University in June, 1997, Julian addressed sanitation certification from a fiscal and a humanitarian standpoint. He is convinced that budgetary restraints are intended to force state and federal health service agencies to down size to a level that the safest and most cost-effective approach to food safety will be to place the responsibility for serving safe food on certified foodservice operators. State and federal regulatory agencies will cease to be the watchdog.

The U.S. has one of the safest food sources in the world. Donna Shalala, U.S. Secretary of Health and Human Services presenting at the "Changing Behaviors, Changing Strategies" conference cautions that although safe food sources are a major

concern, an equally important challenge is to educate foodservice workers and to exercise diligence as our food sources move through multi-levels of distribution.

The Clinton administration Early Warning System has provided an additional 48 million dollars to the Health and Human Services Departments to identify and eliminate possible food contamination problems at their source. Mario Moreno, Assistant Secretary U.S. Department of Education and Interagency Affairs warns that these are soft dollars and additional funding is contingent on positive measurable results. To insure government funding Moreno advises business and education to improve their partnership by pursuing a mutual goal of zero tolerance for foodborne illness and other threats to food safety.

Caroline Smith DeWall from the U.S. Center for Science in the Public Interest supports Dr. Shalala. She is convinced that due to an ever increasing number of avoidable foodborne illnesses, most American consumers no longer assume that foods available for consumption are safe.

Doctor Frederick Angulo, Ph.D. head of Epidemiology for the CDC is concerned with what foods, pathogens and behaviors are causing foodborne illness and, what the costs to society of foodborne illnesses actually are. He sites one outbreak in 1997, where 2200 people had to be immunized when a foodhandler in a student cafeteria tested positive for Hepatitis A. Further investigation disclosed that the facility was a culinary college within a state requiring mandatory certification of all food handlers. Neither the foodhandler, who was a student, nor the

chef instructor whose job description required food safety certification, were certified. Of the 2200 people immunized, 646 were prospective students and their families from 16 states who had just completed a two day recruiting tour of the campus and had returned home. In addition to the cost to the college of the original fly-in, 219 of the 646 people had high risk immune systems and were flown back to the state for further testing (1997).

Institutional Studies

Educational institutions throughout the country have adopted individual approaches to sanitation education. The University of Nevada, Las Vegas makes certification a graduation requirement for students enrolled in its two year hotel management program. Prior to the exam the professors provide a voluntary one hour review. The results of the initial exam for the past five years yielded a pass rate of 88.89%. Students who do not pass the initial exam have four weeks to sign up for a retake exam. These students must also attend two review seminars one hour in length before the exam. The pass rate after the retake exam is 97%.

The Culinary Institute of America (CIA) located in Hyde Park, New York offers a culinary arts program similar to J&W. At the CIA certification is also mandatory. At the CIA, students attend the food safety sanitation course one hour per day during the same term as their freshman production labs. Flow charts, storage tagging dates, time and temperature logs, as well as a complete sanitation inspection are required of all food production areas at the end of each daily session. This process

is carried out entirely by the students. John Kowolski, food sanitation co-ordinator at the CIA verifies these reports through daily follow-up inspections. The results of these reports are shared the following day with the sanitation class. Students are afforded the challenge of providing appropriate solutions for improvement. The pass rate average for the past five years through 1997 has been 89.8%. The pass rate average for the retake exam during the same time period is 97%. The retake exam must also be taken during the next tri. To promote leadership and co-operation, each student who successfully passes three in-house lab inspections while sanitation steward additionally recieve a CIA in-house certificate of achievement to be included in their resume.

Many junior colleges in the U.S. provide sanitation certification courses for foodservice professionals and restaurant operators who need sanitation certification. Courses range from two to five meetings with a minimum of 16 total hours and are taught by state certified instructors. The Community College of Northern Nevada (CCNN) and the Community College of Rhode Island (CCRI) provide courses of this type, each requiring a NRAF sanitation exam. The instructors at these institutions require that those who do not pass the original exam must attend the five hour review session on the last day that the next new class is offered, along with a twenty five dollar retake fee. The three year average pass rate for the initial exam for these two institutions respectively are, 84% and 87%, with retake exam pass rates of 95% and 97%.

Summary of the Three Areas

The literature review focused on food sanitation and food safety education. To provide a clearer understanding of the study, the search was divided into three subject areas. The historical background provided information on the topic, key terms were defined and their relationship to the study were identified. The purpose also was to provide an understanding of how sanitation and food safety has evolved into a critical national issue. The second area explored the importance of sanitation and certification. This information was provided by experts at the highest level of expertise in the subject area, and whose ideas and opinions reflected and represent the American public interest. Finally, institutions were selected as examples to illustrate the role of education in sanitation training. These selected institutions also provided insights into how effectively other institutions approach the topic under study both from an educational and an industry perspective.

Chapter 3

METHODOLOGY AND PROCEDURES

Data Collection

The research methodology using inferential statistics was used to compare the performance in a NRAF retake exam by students taking versus those not taking a review seminar at J&W.

An extensive search of the literature was conducted to provide the conceptual framework for this study. A statistics text was read (Weinbach and Grinell, 1987), the required text for the NOVA research seminar was reviewed (Isaac and Michel, 1990), along with notes taken from the Cordova research seminar at NOVA. Based on this information and discussions with the Local Research Advisor (LRA), the chi-square test was selected to analyze the statistical data collected.

Memos were generated for each instructor and professor two weeks prior to the exam informing all students that there was to be a NRAF sanitation certification retake exam offered April 10, 1997. The memos further informed the students that there would also be two voluntary review seminars offered. These memos were read in class by the instructors and also placed on bulletin boards throughout the culinary campus. Students were under no obligation to attend either of the seminars, and the only requirements were that they sign up for the retake exam to insure that there would be an exam provided for them and bring fifteen dollars required by the EFNRA the day of the exam to cover the handling cost of the testing material.

The 1997 J&W student report from the EFNRA was used to determine how many students currently enrolled did not pass the original exam. This information was used to determine the number of exams to order.

Three days prior to the exam, the researcher provided a 90 minute review seminar for students attending am classes and one review seminar for students attending pm classes. An attendance record was kept to identify the students who attended the seminars and those who did not. It was determined that all students attended only one seminar.

To help ensure the integrity of the exam, the EFNRA provides four different certification exam series, all consisting of eighty multiple choice questions. The questions in all series are the same, but the order of the questions and answers is often changed. The series number is also not known until the packets are received from the foundation.

When the two seminars were completed, the retake exam was administered to two groups, to students who had taken the seminars and to those who had not. The retake exam packets were sent to EFNRA for correction and returned within two weeks. The results were then analyzed using the chi-square test of inferential statistics to determine if there was a significant difference between the two groups. Data was analyzed using a statistical program "Statistics on Software" (Timko and Downie, 1991).

The sample consisted of both freshman and sophmore culinary students who initially did not pass the certification exam. The

population was under no obligation to attend the review seminars or take the makeup exam. All students took the exam together with the researcher and three proctors present. The tabulated results of the exam were used to determine if there was a significant difference in the pass rate between students attending the seminar than those who did not.

Data Presentation

The observations were organized in crossbreak form (Best & Kahn), that is a proforma 2x2 chi-square table. One table was used to illustrate the chi-square findings on the research question.

Data Analysis

The chi-square test method of inferential statistics was used to analyze the data. This test was selected because it is used to analyze categorized data rather than ordinal, such as pass, no pass. Chi-square estimates the liklihood that some factor other than chance accounts for the apparent relationship. It is assumed in this study that the data collected was not normally distributed, therefore this non-parametric test was used. Lastly, it tests for independence or the idea that one variable is not affected by, or related to, another variable.

Null Hypothesis

There was no significiant statistical difference between the pass rate of J&W students taking the NRAF sanitation certification exam who attended a review seminar and students who did not.

Level of Significance

The null hypothesis will be rejected at the .05 level of significance with one degree of freedom. This level is typically used in social science research because it strikes a balance between a type one and type two error.

Region of Rejection

For this chi-square test a critical value of 3.84 is necessary to reject the null hypothesis that there is no significant statistical difference between the pass rate of J&W students taking the NRAF sanitation certification exam who attend a review seminar and students who did not.

Assumptions

It was assumed that there would be two groups participating in the study, those who attended a review seminar and those who did not. It was assumed that the method of presentation and the educational material covered in the two review seminars were the same. It was assumed that the two groups were similar in socio-economic factors, participated voluntarily and only attended one seminar. It was also assumed that if the null hypothesis was rejected, J&W would develop a process that would increase the pass rate for students retaking the NRAF certification exam. It was further assumed that there would be enough students representing both samples taking the retake exam to successfully complete the study. Finally, it was assumed that the data gathered was categorical, not ordinal and the data collected was not normally distributed.

Limitations

There was one limitation identified before the study began. The study was self-limiting in that it was limited to J&W, CCA and was not generalizable to other institutions.

Once the study began, other limitations were identified. There were students who may have wanted to take the exam, but were off campus fulfilling their co-op or practicum externship. Time may have also been a limiting factor in the study. Originally 121 students had signed up for the NRAF retake exam, but only 85 took the exam. There were only ten days for students to decide if they would or needed to take the retake exam. The fact that the exam was not mandatory may have influenced student participation. Some students indicated that they would wait until the next time the retake exam was offered because it either interferred with other class responsibilities, or they didn't have the fifteen dollars.

Chapter 4

RESULTS

A literature review was completed and organized using three subject areas, historical background, the current status and selected institutions studies. The review encompassed text books, conferences, seminars, periodicals, U.S. government reports, national studies, catalogs, journals, and personal interviews. The chi-square test of inferential research was used to analyze the statistical data that was previously collected.

Outcomes

The student report from the EFNRA showed there were 286 J&W students presently enrolled who met the requirements for the retake exam. On March 20, 1997, 150 exams were ordered from the EFNRA. By April 10, 121 students had signed up for the retake exam.

Three days prior to the exam, the researcher provided a 90 minute review seminar for 17 students attending am classes and one for 22 students attending pm classes. The attendance record determined that all 39 students attended only one seminar. The sample consisted of both freshman and sophmore culinary arts students who initially did not pass the certification exam and were under no obligation to attend the review seminars or take the retake exam.

On April 12, 1997, 85 students took the NRAF Series-501 sanitation exam with the researcher and three proctors in attendance as recommended by the EFNRA for a class of this size. The exam was administered to two groups, to those 39 students who

had taken the seminars and to 46 students who had not. The completed exam packets were sent to the EFNRA and the results returned by April 22, 1997. The test results showed that of the 39 students who had attended the seminars, 36 had passed and 3 had not. The results further showed that of the 46 not attending a seminar, 28 students had passed and 18 had not.

The outcomes from the study produced sufficient data for analysis. The data was analyzed using the Statistics on Software program, the null hypothesis was tested, and observations were organized in a proforma 2x2 chi-square table.

The results of the Statistics on Software test for chi-square was to reject the null hypothesis at the .0500 level of significance because X) of 11.213868 is greater than the critical value of 3.841000. The degree of freedom (df)=1, and the P value was 0.00081. In tabular format, the findings were:

Table 1

Chi-Square Analysis of Data to Determine if There is a Significant Difference Between the Pass Rate of J&W Students who Attend a Review Seminar Than Those That do not.

	Attended seminar	Did not attend seminar
Passed Exam	29.36	34.64
Did not pass exam	9.64	11.36

The research hypothesis for this study was, there is a significiant statistical difference between the pass rate of J&W

students taking the NRAF sanitation certification exam who attended a review seminar and those who did not.

Summary of Findings

In summary, the results of the analysis of the data indicated that there was a statistically higher pass rate between those J&W students attending a review seminar than those who did not.

Chapter 5

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Discussion

The results of this practicum were related to its purpose which was to compare performance in a certification exam by students taking versus those not taking a review seminar at J&W. Eighty five students took the certification exam and the results provided sufficent data to test the research hypothesis. The results confirm that there was a significiant measurable difference between the pass rate of students who attended a review seminar and those who did not.

Each area of the literature search had its own contribution to the final analysis of the study. To assist in understanding the issue of food safety and sanitation education, it was necessary that the literature reflect the past, present and future status of the topic of research.

Institutions delivering sanitation education that have increased pass rates of students both taking and retaking certification exams were identified. The processes have contributed internally to the effectiveness of their respective institution and may be used as benchmarks, totally or in part, to improve educational quality at J&W.

These institutional processes were directly related to the purpose of the practicum, and to the value of using inferential research. The problem under study, as well as the results of the statistical data were specifically related to the internal situatation at J&W. Due to the ever changing internal and

external environment of all educational institutions, it is necessary to seek answers to problems that may improve the educational effort regardless of their outcomes. It was also important to test the null hypothesis so that changes can be instituted as needed.

There was an interelationship among the literature review, the practicum and the statistical study. Although the conclusions, implications and recommendations are restricted by the assumptions and limitations mentioned in chapter three, they are important to the planning process of the college.

Conclusions

There was one research question for this study. That was, is there a difference between the pass rate of students attending a review seminar before taking a sanitation certification at J&W than those who do not? In providing the answer to this question, the following conclusions were drawn.

It was first concluded that the results of the chi-square statistical test was to reject the null hypothesis at the .0500 level of significance because X) of 11.213868 is greater than the critical value of 3.841000. The degree of freedom (df)=1, and the P value was 0.000081. It was also concluded that the study met expectations of comparing the pass rate of students taking versus those not taking a review seminar at J&W.

It was further concluded that there was a significant statistical difference between the pass rate of students taking versus those not taking a review seminar before the NRAF sanitation certification exam. The final conclusion, which was

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drawn from the literature review, was that the student pass rate for both the initial and the retake exam were both higher than J&W students at institutions where review seminars were offered and certification was mandatory.

Implications

A number of implications became evident upon considering the outcomes of this research practicum. Groff (1991) has stated that "a fish is aware of everything in its environment except the water it lives in. As with the fish, it is only when something goes wrong with the system that we become aware of it (p.38)." There was an awareness for the need to employ measures to increase the pass rate of students taking the sanitation certification exam at J&W. This was implied by the request of the culinary dean for faculty recommendations to address the research problem. It was also implied that the results of the study would be reviewed by the culinary dean and changes made to the existing process.

It is implied that students certified in food safety and sanitation have academically demonstrated that they possess the knowledge to function effectively in the foodservice environment. This knowledge may also be transferrable to other culunary students both in the laboratory and in the industry.

An implication identified in the literature review was that students attending a review seminar before the initial or retake exam at other institutions, achieved a higher pass rate than all J&W students. This is true of institutions requiring mandatory certification and also those who did not. The statistical

results of the J&W study, the EFNRA branch campus statistics and the information from the literature review further imply that if a similar process were implemented at J&W, a higher pass rate would be realized. The results of this process would have favorable implications on all four J&W culinary college campuses. Students will have better food safety skills that may minimize the possibility of a foodborne outbreak within the college and the community in which it functions. A high pass rate of certified students can have a positive impact on branch campus enrollment, alumni satisfaction, retention, job placement and industry relations. Finally, the fact that most employers require sanitation certification as a prerequisite to being hired also adds external validity to the certificate and enhances the employability of J&W graduates.

It is finally implied that by developing a high quality sanitation testing process that is congruent with the needs of students, industry and society, J&W can become a benchmark for other institutions of higher education. Today there is a swelling stream of culinary programs competing for a shrinking market of culinary arts students. Because of this fact, it is vital to a career college such as J&W to focus on the educational quality of its graduates and their competitiveness in the global marketplace.

Recommendations

It is recommended that a process similar to the one developed in this research practicum be implemented at J&W as soon as possible. To improve the pass rate of students taking

the initial sanitation exam, it is also recommended that a review seminar be offered prior to that exam.

It is recommended that data pertinent to this study be collected and analyzed each trimester. Changes should be made as needed to improve both the pass rate of students taking the initial certification exam and the retake exam.

Upon analyzing the results of the statistical data of the study and the EFNRA statistics concerning the pass rate of all four J&W campuses, it is further recommended that a review process be implemented at all J&W campuses as soon as possible . The results of this study can also be beneficial to other certificate programs offered within each college, and the university as a whole.

The final recommendation is that student who do not achieve a passing grade after two retakes of the NRAF sanitation certification exam must retake the 1050 course.

REFERENCES

Best, John K., and James V. Kahn. (1989). Research In Education. Englewood Cliffs: Prentice Hall, Sixth Edition.

Centers for Disease Control and Prevention, April, (1997). Surveillance for Foodborne Disease and Outbreaks. U.S. 1995-1997. Atlanta GA, U.S. Department of Health and Human Services.

Cichy, Ronald F. (1994). Sanitation Management. The Educational Institute Of The American Hotel And Motel Association. Lansing, Michigan.

Culinary Institute of America. (1996-1997). Take a closer look. Continuing Education Catalog.

Educational Foundation of the National Restaurant Association. 1997. Johnson & Wales Student Activity Report. Chicago, Illinois.

Educational Foundation of the National Restaurant Association. (1994). Applied Foodservice Sanitation. Fourth Edition.

Food and Drug Administration, Division of Federal and State Relations, State Training and Information Branch (HFC-153), 1996, 5600 Fisher Lane, Room 12-07, Rockville, Maryland, 20857.

Gould, Kyle. (1995) National Food Safety Summit Focuses on Key Food Safety Issues. Dairy Food And Environmental Sanitation. Dec.95 Vol: 15, No. 12, pg:756.

Groff, W.H. (1991). Emergence of Vocational, Technical, and Occupational Education in America. Ft Lauderdale, FL: Nova [Southeastern] University.

Marriott, Norman G. (1994) Principles of Food Sanitation. New York: Van Nostrand Reinhold, Second Edition.

Non-Uniformity of Regulations and the Foodservice Industry. Current Issues Report, Washington D.C., 1996, #C1400, Centers For Disease Control.

Timko, John and Jon Downie. "Statistics on Software." Orange, CA: Statistics for Management, 1991.

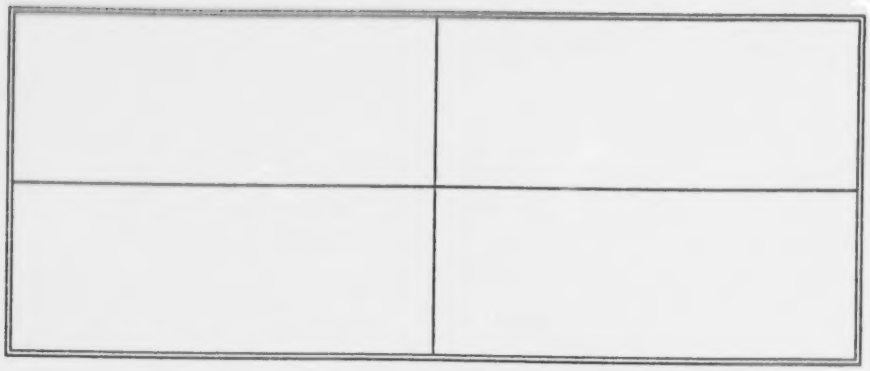

Figure 1.